SECTION III.—FORECASTS.

FEBRUARY WEATHER.

By Alfred J. Henry, Professor of Meteorology.

PRESSURE IN NORTHERN HEMISPHERE.

The Aleutian low.—The normal change in atmospheric pressure from January to February in the region of the Aleutian Islands, as determined from the noon Greenwich International Observations, 1878–1887, is about (plus) 0.15 inch. The actual change January to February was a very small amount in the opposite direction. Pressure was relatively high in February during the first week of the month, and almost continuously low thereafter. A marked depression occupied the region from the 12th to the 18th, and again from the 20th to the 27th.

Pressure at Honolulu.—During February the pressure at Honolulu was relatively low during the first half of the month, and persistently high during the second half. The character of the variations at Honolulu were only very roughly opposite in phase to those of the Aleutian low.

Iceland.—The normal change in barometric pressure January to February is almost negligible. The actual change was negative and amounted to about 0.35 inch. There were but two periods during the month when pressure reached the normal value, viz, on the 6th, and again on the 16th–17th. On both occasions pressure was high over the Azores; that is, above the seasonal normal. While the character of the oscillations at both points were similar in phase, it so happens that the same increase in pressure at both places does not necessarily produce the same resultant pressures with respect to the normal, owing to the great difference in the absolute values of the initial pressures.

The fluctuations at the Azores were generally small and unimportant; positive and negative oscillations followed each other at comparatively short intervals.

Siberia.—The pressure fluctuations in central Siberia, as at Irkutsk, were likewise small and unimportant, thus indicating a month of changeable weather, not, however, departing very widely from normal conditions.

FEBRUARY PRESSURES IN THE UNITED STATES, WITH SOME REMARKS ON CYCLONES AND ANTICYCLONES AS UNITS OF WEATHER CONTROL.

Monthly mean pressure signifies merely the arithmetical mean of the pressure values recorded during the month—in this case, the arithmetical mean of twice daily observations at 8 a. m. and 8 p. m. seventy-fifth meridian time. A much better idea of the actual fluctuations of pressure is secured by plotting them in the form of a curve, the peaks of which will indicate the passage of areas of high pressure (anticyclones) and the valleys the passage of areas of low pressure (cyclones).

The use of the anticyclone and the cyclone as units of weather control, as advocated by Prof. R. DeC. Ward, of Harvard, would seem to have some distinctive advantages in discussing the weather of the month as produced by the eastward movement of these phenomena.

The attempt will be useful in possibly establishing more definitely than is at present known the relation which subsists between the movement of highs and lows, and the resulting weather for a considerable time over large areas. Should it ever become possible to forecast the run of highs and lows for a month or a season it will be an easy matter to supply in advance the details of the weather in various parts of the country for the same time.

As a first step in the proposed discussion it is convenient to utilize the charts published in the Monthly Weather Review, showing the tracks of highs and lows; but first of all we must disentangle the apparently hopeless network of tracks that are found on the charts named. This can be done by classifying the highs or lows according to their respective places of origin, and drawing a separate chart for each class; thus we will be able to perceive the variation both in number and direction of both highs and lows, and to arrive at a more rational understanding of at least the visible processes whereby one season is warmer or colder, wetter or drier, than another.

We have divided both the highs and the lows into five classes, according to the geographic position of their apparent origin, and have prepared 55 charts (not reproduced here), 5 for each month, for highs and lows, respectively.

February lows, 1904–1914.

The classes adopted for lows are: (1) Pacific (coast of Washington, Oregon, and California only); (2) Alberta; (3) East Slope, embracing eastern Colorado, Kansas, Oklahoma, northern New Mexico, and the Panhandle of Texas; (4) Southern Slope, embracing southern Nevada, Arizona, southern New Mexico, and southwestern Texas; and (5) the west Gulf. The latter includes the immediate Gulf coast west of the mouth of the Mississippi and extreme southern Texas to the mouth of the Rio Grande River.

Any division according to geographic boundaries must be more or less artificial, since there is, roughly speaking, but a single place of origin of winter storms that visit the United States, viz, the Pacific Ocean. We distinguish, however, between lows that pass into the United States directly from the Pacific and those which come in from the Pacific by way of the Canadian Northwest; and since the great majority of the latter come in by way of Alberta, we have given the name "Alberta" to those storms which first appear in the Canadian Northwest Provinces. We make a further distinction between Alberta and Pacific storms; the former seem to have a much greater tendency than the latter to break up into separate and apparently detached storms, and occasionally to disappear as separate and distinct storms only to apparently reappear a few hundred miles to the southeast or south as a fresh disturbance. On the other hand,

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lows that enter the United States along the coast of southern California, or move to that region from a more northern point of entrance, seem to possess, for February at least, more cohesion, more vigor, and thus, as a rule, they pass across the continent with little, if any, loss of their original energy. These vigorous Pacific storms, however, form only a relatively small per cent of the total number of lows that originate over the Pacific and pass inland. A count of such storms for the last eleven Februarys discloses the fact that only 50 per cent of them finally reach the Atlantic.

The so-called East Slope and South Slope and West Gulf lows, in the belief of the writer, owe their origin either to the eastward movement of an Alberta low or a North Pacific low in higher latitudes, or to the development of a whirl in the rear of a rapidly moving area of high pressure over the Gulf States or Tennessee. In other words, they are mostly secondary developments.

TABLE 1.—*February lows during 1904–1914, classed according to origin.*

Year.	Alberta.	Pacific.	East Slope.	South Slope.	West Gulf.	Total.
1904	4	5	2	1	1	13
1905	4	3	1	1	3	12
1906	3	4	3	0	0	10
1907	3	2	2	0	0	7
1908	3	4	0	2	0	9
1909	5	4	0	2	0	11
1910	1	4	4	1	1	11
1911	2	4	1	2	1	10
1912	2	0	1	3	1	7
1913	3	1	1	2	2	9
1914	6	1	4	2	1	14
Mean	3.3	2.9	1.7	1.4	0.8	10.0

The figures of Tables 1 and 2 in connection with the charts, show at once that while one February is much like another in the larger features which control the weather, there is a considerable variation in the smaller features, and particularly in the combinations of the different types which after all give individuality to the month. Some additional remarks will now be made in further elucidation of this point, before discussing the weather of February, 1914.

Table 1 shows quite clearly that the majority of February lows belong to the Pacific and Alberta types. The course taken by storms of these types after they have passed inland is east to the St. Lawrence Valley with more or less looping to the south. The extreme southerly point reached is, of course, the Gulf of Mexico; the course thence being generally northeast to the St. Lawrence Valley or New England. Both types of storms, however, may vary decidedly from the course above set forth, as in the case of February, 1904, when the Pacific type of storms almost invariably moved southeastward over the Rocky Mountain region and the southern Plains States to the Gulf of Mexico. Arriving there several of them expired, while those which persisted took an easterly course over Florida instead of moving to the northeast, as is usual. Moreover, lows of the Alberta type for this month moved almost directly east over the Great Lakes, with practically no looping to the south, and there was no movement of lows from the Gulf region northeastward.

Space does not admit of giving the result of this distribution except to say that precipitation, while abundant in the Gulf States, was elsewhere deficient. The temperature was relatively high southwest of a line drawn from Florida to British Columbia, and low to the northeast of that line, the greatest depression being in the lake region. Another abnormality of the month was the singular fact that the Pacific lows that moved southeast over the Plains States were not followed by Alberta highs; consequently cold northerly winds, so frequent in like pressure distributions, were absent. Possibly the absence of Alberta highs may be attributed to the local temperature distribution over Alberta and other northwestern provinces. On this point the director of the meteorological service of Canada says:

> The mean temperature of February [1904] was decidedly below average throughout the Dominion and to the greatest extent in Alberta, where the negative departure amounted to 17° F.

The principal abnormalities of February, 1905, were exceptionally low mean temperatures in practically all districts east of the Rocky Mountains, the depression of temperature amounting, in the lower Mississippi Valley and northern Texas to 10° F per day; deficient precipitation except on the Pacific Coast and over Arizona and New Mexico; and great excess of sunshine over the upper Missouri Valley. The explanation of these abnormalities is somewhat involved, since it concerns not only the storm tracks but a combination of high pressure and low pressure over the central Rocky Mountain Region in such relation to each other as to produce a generous distribution of cold northerly winds over practically all districts east of and including the Plains States.

This configuration for which the name "Rocky Mountain" type is suggested, consists essentially of a strong area of high pressure or anticyclone central over the upper Missouri Valley, with its crest generally over Montana, in which maximum pressure ranges from 30.70 to 31 inches, in combination with an area of low pressure which is situated on the other side of the mountains, approximately 500 or 600 miles southwest of the crest of the anticyclone. The pressure differences over the strip of country intervening are generally more than an inch of mercury and the differences in temperature may be as much as 80° F. The fact that these great extremes are separated by the Rocky Mountains doubtless tends to greatly augment the contrasts, especially in those districts, as in Colorado, where the mountain barrier is a considerable one, and the transit from the plains to the mountains is quite abrupt.

The winds throughout the region of apparent strong pressure gradients are without exception gentle in force, and mostly from a northerly or easterly quadrant. The barometric gradient is probably fictitious, due entirely to temperature differences on the two sides of the mountains, since the winds do not respond in the slightest degree to the apparent pressure gradients.

Observations of temperature during the prevalence of the Rocky Mountain type show that the plains temperatures are quite low, generally close to zero or below, Fahrenheit, while the air temperature increases with altitude on the eastern slope of the mountains, finally differing but little at the higher altitudes from the air temperatures on the western side of the mountain at lower levels, which, it may be remembered, are under cyclonic control, and range from the freezing point to a few degrees above.

The anticyclonic member of the combination which is central over the upper Missouri Valley, seems to possess the ability of remaining in statu quo for 24 to 36 hours, meanwhile sending off forks, or branches, which move directly to the east or southeast. These branches soon become separate anticyclones and continue their movement to the Gulf of Mexico or the Atlantic. As soon as the anticyclone begins to fork, or separate, that region along which the separation takes place, or the fault is produced, to borrow a geological term, becomes favorable ground for the development of an area of low pressure of the trough form, with opposing winds, rain on one side, and snow or sleet on the other. We have, then, a typical winter storm, with a retreating high, or anticyclone, on the east side, and a semipermanent anticyclone on the northwest, which, immediately the cyclone reaches the Mississippi Valley, sends off a second anticyclone in its rear. In this manner the country is successively swept by cold northerly or northwesterly winds, and the temperature is very materially lowered. There are other modifications of the Rocky Mountain type of which space does not admit description.

Passing now to a consideration of the abnormalities of the weather of February, 1905, as the result of cyclonic and anticyclonic control, we would say that the Rocky Mountain type of weather prevailed without a break from the 1st to the 7th and again, with short interruptions, from the 9th to the 15th.

The extraordinary rains in Arizona and New Mexico were caused by the meanderings of a low (No. I–A of Chart II, Monthly Weather Review, v. 33, Feb., 1905) which for seven consecutive days oscillated back and forth from the Pacific to the Rocky Mountains, and finally breaking through the barrier of high pressure over the Missouri Valley passed eastward to the Atlantic. This low at the same time served as the far, or west side, member of the Rocky Mountain type before referred to.

The low monthly mean temperature east of the Rocky Mountains is explained as due to the fact that the weather was under the control of the Rocky Mountain type from the 1st to the 7th, and again from the 9th to the 13th. In that time, and up to the 19th, six anticyclones passed from the upper Missouri Valley to the Atlantic, and their movement was so timed as to produce and sustain low temperature everywhere east of the Rocky Mountains, as before stated.

The excess of sunshine in the upper Missouri Valley was due to the prevalence of strong anticyclones over that region during the first half of the month.

In February, 1906, no lows developed over the West Gulf or the south slope. Precipitation was deficient in nearly all districts. The temperature was near the normal in the southeastern part of the country, and considerably above the normal west of the Mississippi. No lows developing in either the west Gulf or south slope apparently had a tendency to prevent the southward movement of highs into those regions.

February, 1907, with only seven lows, was dry in all parts of the country, with relatively low temperatures in the east and high temperatures in the west. The shortage in rain we attribute directly to the small number of lows that were developed; also to the fact that all of the Alberta lows followed the northern circuit, viz, across the Great Lakes, and that no important lows passed from south to north over the interior valleys.

February, 1908, with a larger number of lows, mostly in the middle and northern regions of the United States, brought fairly abundant rains in the majority of districts, with cold in the Atlantic and Pacific districts and higher temperatures in the Rocky Mountains and Plains States. The characteristic feature of this month was a fairly uniform distribution of lows both in the lake region and the interior valleys.

February, 1909, was the warmest month of the series, and had also fairly abundant precipitation, especially east of the Mississippi and south of the Ohio. The immunity from cold is not fully understood. The month had eleven lows and but seven highs. The latter were generally lacking in cold and of short duration, especially in the Alberta region. Any weakness in the movement or intensity of highs in the Alberta region seems to be reflected elsewhere in the United States. Alberta lows, although they followed the northern circuit, generally looped farther southward than usual. Had each low been followed by a corresponding high the temperature would undoubtedly have been much lower. Mean temperature in the southern portion of Canada was also above the normal, but in a lesser degree than in the United States; while in the northern portions of Canadian provinces temperature was below the normal, and this was especially pronounced in Alberta, where in the south the positive departure was 2° F., while in the north the negative departure was from 5° to 7° F. We recognize, although we are unable to explain the fact, that in some years cold is intense and anticyclones numerous over Alberta, while in other years temperatures are relatively high and anticyclones infrequent.

Only the very broad departures from normal conditions are susceptible of what seems to be a rational explanation.

Following are some of the most obvious relations between the movements of lows in the United States and the resultant weather:

(1) When the tracks of lows are massed along the northern circuit temperature will be high and precipitation light east of the Rocky Mountains. The winds will be mostly southerly, and therefore relatively warm. The opportunity for precipitation comes with dynamic cooling or cooling by mixture, both of which are absent in marked degree under the pressure conditions above outlined.

(2) A uniform distribution of lows in latitude, and especially a movement from southwest to northeast over the interior valleys, are essential to heavy rains east of the Mississippi. (*b*) The development of high pressure over the northeastern Rocky Mountain Slope and the Upper Missouri Valley and also of low pressure over the southwestern slope of the Rocky Mountains is essential to fairly abundant precipitation in the Missouri Valley, the Plains States, and the Central Rocky Mountain Region. (*c*) An absence of high pressure over the northern portion of the Great Basin and frequent lows advancing from the Pacific are the essentials of a season of abundant rains on the Pacific Coast. The reasons for the above are obvious.

(3) Low temperature east of the Rocky Mountains seems to be conditioned on the magnitude of the high-pressure area that must cover British North America and the course in latitude of the lows which traverse the United States, a movement in low latitudes being favorable to great cold and in high latitudes to unusual warmth.

AREAS OF HIGH PRESSURE DURING 1904–1914.

The writer has classed the highs of February, 1904–1914, according to their origin, as described in this paper for lows, except that the places of origin for highs is somewhat different from that chosen for lows. The highs appear to originate mainly in Alberta and to the eastward of that province, centering for the western part of Canada in Alberta and for the eastern portion in the region of Hudson Bay. Highs also skirt the Pacific coast, coming from the south and passing inland over Washington and Oregon, and either merge with Alberta highs or pass to the south and east and lodge over the Great Basin region.

In forming Table 2, the regions selected were as follows: (1) Pacific; (2) Alberta; (3) Ontario, east of the one-hundredth meridian; (4) eastern slope of the Rocky Mountains; and (5) east of the Mississippi.

TABLE 2.—*February highs classed according to origin during 1904–1914.*

Year.	Pacific.	Alberta.	Ontario.	East Slope.	East Mississippi.	Total.
1904	1	7	0	4	1	13
1905	1	2	2	1	1	7
1906	2	6	2	0	....	10
1907	2	3	0	0	....	5
1908	2	3	3	2	....	10
1909	0	2	1	3	1	7
1910	0	5	1	1	....	7
1911	3	2	1	0	....	6
1912	3	4	2	0	....	9
1913	2	4	3	0	....	9
1914	5	4	2	....	....	11
Mean	2.0	3.8	1.5	1.0	0	8.5

We remark that the total of 94 highs charted in February, 1904–1914, is 19 less than the total number of lows for the same period. In some years the difference is greater, as in the warm February of 1909, when 11 lows were charted and only 7 highs. In February, 1905, 12 lows and but 7 highs were charted.

The principal place of origin of the highs is in the Canadian Northwest, probably over the mountain region that parallels the coast northward from British Columbia. It seems probable that offshoots from the more or less permanent area of winter high pressure that must occupy that region are the cause of low temperatures in the United States. A knowledge of the development of that area of high pressure during the winter months would aid in the forecast work of the United States Weather Bureau.

In the absence of observations beyond the meteorological frontier of the weather map, which is outlined by the stations of Calgary and Edmonton, in Alberta, and Prince Albert in Saskatchewan, we can only draw inferences as to the actual pressure conditions over northern British Columbia, Alberta, and Saskatchewan, the terra incognita of the weather map.

The pressure changes along the frontier—that is, the changes from rising to falling pressure, and vice versa—are very rapid; it is not as if the cycle of change from rising to falling pressure, or vice versa, occupied a period of, say, 36 hours, as in the case generally elsewhere within the region of observation, but the cycle seems at times to exhaust itself within 12 hours, as is evidenced by the change in phase frequently manifest in the twice daily observations. By change in phase is meant a change from rising to falling pressure from one observation to the next.

In the United States the areas of high pressure which occasionally lodge over the Great Basin and the western Rocky Mountain regions seldom, or never, pass eastward across the main chain, but offshoots are discharged to the southeast over Oklahoma and northwestern Texas. It may be that in a similar way the winter area of high pressure over British North America discharges masses of chilled air from its southeastern front simultaneously from Edmonton and Calgary, in the west, to Prince Albert, in the east, and that the air movement is thus directly southward, rather than southeastward. The only instance of a movement from the northeast occurred on the 22d, when high area No. VIII, Chart II, seemed to advance or spread to the southwest, the crest of the high advancing from Winnipeg at 8 a. m. of the 22d to Devil's Lake, on the evening of that date, thus giving an apparent movement of the high toward the southwest.

The large number of Alberta highs, the facility and rapidity with which they overspread the northern boundary States, and the intense cold that accompanied the most of them, are collectively the feature of the weather of February, 1914.

THE WEATHER OF FEBRUARY, 1914.

The only portion of the country not traversed by one or more lows was the extreme southwest, including southern California. It is true that a low was central off the Oregon and Washington coast, from the 17th to the 22d, and that its presence caused strong southeast winds, and rain over the Pacific coast States, with snow in the mountains of Arizona, Nevada, California, Oregon, Washington, Utah, and Idaho. This low, however, failed to move inland as a vigorous storm and apparently filled up on the 22d over the State of Washington. The majority of the lows of the month belonged to the Alberta type—a type, be it remembered, that is characterized by an uncertainty of movement and development over the central Rocky Mountain Region that is the bête noire of the forecaster.

On the p. m. of the 21st a low appeared over the central Rocky Mountain region, which later developed into a storm of much strength; it was one of those Alberta lows which pave the way for high northerly winds and low temperatures to sweep southward from the Dakotas to Texas. There were two such storms during the month, both attended by cold weather and freezing temperatures to the Gulf coast. Elsewhere east of the Rocky Mountains the weather was changeable, short periods of fair weather being followed by rain in southern and snow in northern districts. The month as a whole failed of being a wet one because of the erratic movement of at least three lows; Nos. III, VII, and XI of Chart No. III; low No. III apparently filled up over Virginia during the 5th; low No. VII advanced as far as northeastern Tennessee by the p. m. of the 13th, when it diminished greatly in strength. In the meantime a secondary storm center developed off the North Carolina coast, and moved northeastward as a severe storm, especially off the southern New England coast, on the morning of the 14th.

It seems to be a fair precept in forecasting that when a low is diminishing in energy the probability is that a fresh center will shortly develop, generally a little to the east and south of the dying low.

The most severe storm of the month along the Atlantic Coast developed as a secondary storm during the afternoon of the 28th—see Chart III, No. XIII-A. This development occurred in connection with the rapid eastward movement of low No. XIII during the 27th–28th. Pressure in this low was 29.16 inches at Winnipeg at 8 p. m. of the 27th. Twelve hours hence the center was at Alpena, and pressure had risen to 29.44. In the meantime a shallow depression was passing eastward over the Gulf of Mexico, with pressure near 30 inches, off the mouth of the Mississippi. Twelve o'clock specials on the 28th showed a fall in the barometer along the Gulf Coast, but nothing alarming. At 5 p. m. a special observation from Macon, Ga., showed a very rapid fall in pressure. Storm warnings were thereupon hoisted from Norfolk to Savannah. Three hours later, when the 8 p. m. observations had been received, a storm of marked intensity was central off Savannah, Ga., whereupon warnings of northeast gales were extended from Norfolk to Eastport. The subsequent history of this storm will form a part of the March Review.

From the point of view of the forecaster the failure of southern lows to advance into northeastern districts was one of the features of the month, notably in connection with lows Nos. III, VI–A, VII, and IX, which seemed to be marked for the southern New England Coast but moved off to sea over the Atlantic. These failures to move to the northeast are now believed to have been due to the obstruction presented by New England highs; and the precept to be drawn from the failures is that a low will not move into a region that will be occupied on the morrow by an incoming high. The forecaster must distinguish between a high in situ and an incoming high. The reason back of this is that with an incoming high, as in the case quoted, the winds would be from the north or northwest, with falling temperature; conditions inimical to the development and sustenance of a low.

STORM WARNINGS DURING FEBRUARY, 1914.

More than the usual number of severe storms visited the North Atlantic Coast. Warnings were issued on the 6th, 7th, 10th 13th, 14th, 16th, 20th, 23d, 25th, and 28th. On the Pacific Coast the main storm period occurred between the 17th and 22d. Warnings were issued on these dates, and also on the 23d, 26th, and 28th.

The Gulf Coast was not visited by severe storms, although warnings for high northwest winds were displayed on the 6th and 23d.

THE VALUE OF WEATHER FORECASTS IN THE PROBLEM OF PROTECTING FORESTS FROM FIRE.

By EDWARD A. BEALS, District Forecaster.

[Dated Weather Bureau, Portland, Oreg., Nov. 29, 1913.]

Climate is defined as the sum of weather conditions affecting animal and plant life, and as trees come under the head of plant life, they are affected by climate from whatever point of view the cause and effect of climate in connection with forests may be considered. The integral elements of climate are the general atmospheric conditions, or in other words the weather from day to day, and it is the purpose of this paper to show whether or not advance information about the weather can be used to advantage in reducing the fire losses in forested areas.

Weather forecasts are not accurate, nor will they ever be, no matter how perfect the method by which they are made. They are the product of the human mind, which is liable to error in every walk of life. Mistakes are sometimes made in the transmission of forecasts, and sometimes they are wrongly interpreted; while we can not expect perfection, it is safe to expect the forecasts to be verified about five times out of six, and in some special lines, such as warnings of floods and storms, the percentage of accuracy is even greater than this.

Weather forecasts are made in the expectation that those receiving them will be able to protect their interests when threatened by adverse weather, otherwise they are of no special benefit to anyone. It would do no good to warn a vessel of a coming storm if that vessel could not avoid it or was so constructed that she could not take in sail, batten down her hatches, and securely lash movable articles to the best advantage. Neither would it do any good to advise a farmer of a coming frost if he were unprepared to protect his crop. It would only be giving him cause to worry before the damage was done, and as worry is said to shorten life he should be saved from as much of it as possible.

Trees according to their species require heat and moisture in variable quantities. There is a maximum, a minimum, and an optimum of both elements for each species which varies with the season of the year. Forests are subject to serious injury if the winds are strong enough to blow down a large number of trees before they are matured. If known beforehand that a forest is threatened by damaging extremes in temperature, precipitation, or wind, no economic protective measures could be taken to avert the danger, and it would suffer according to the extent and character of the subsequent weather, however severe it might be.

Damage by extremes in temperature, precipitation, or wind is not great when compared with the damage done by fire that is fanned by winds of moderate force. Preparedness against fire can be taken in all forested areas by increasing fire patrols, putting out smouldering fires, and shutting down dangerous logging operations for a short period; therefore if winds favorable for spreading forest fires can be foretold the information would be of great benefit to all concerned in the preservation of forests.

Droughts and periods of hot weather contribute to the fire hazard, but these conditions alone do not necessarily portend the occurrence of a great fire, as without wind an incipient fire would spread slowly and could soon be extinguished by modern fire-control methods. In quiet air a fire causes inflowing currents that might attain a surface velocity of 20 miles or more if the fire was intense and not too limited in extent. These inflowing winds would operate to check spreading, except as large embers were carried aloft, and after leaving the vortex drifted slowly to a distance before coming to the ground. In such cases a new fire would be started, and if there were many such embers, and they were not promptly extinguished, the fire might burn over a large area.

Usually after a period of hot, still weather we can look for increasing winds, and if the period of hot weather has been attended by drought conditions are most threatening, and it is then that reliable wind forecasts could be used to good advantage. The problem of making them is extremely difficult, much more so than the predicting of stormy winds along our sea coast, owing almost if not wholly to the fact that the sea is level and the forests are generally located in a hilly or mountainous country. Over the sea the winds follow the pressure gradients with uniformity, while over the land, especially in mountainous countries, they are deflected by topography to such an extent that at times it is impossible to recognize their relationship to the pressure gradients, either as regards force or direction.

Winds causing the spread of forest fires may be divided into three classes in the order of their importance, as follows: Cyclonic winds, mountain and valley breezes, and winds having monsoon characteristics. All three classes may prevail at the same time, and they act and react on one another in a most confusing manner. Our largest and most destructive forest fires occur when cyclonic winds are the dominating feature over a large area, and especially when they cause foehn or chinook conditions on the leeward side of mountains. By cyclonic winds reference is made to those caused by a large atmospheric disturbance wherein the winds blow systematically, and they may be associated either with a cyclone or an anticyclone.